

## Answer on Question #42866, Physics, Mechanics | Kinematics | Dynamics

How would a violin player produce a higher frequency sound with a violin string?

### Solution:

The pitch (frequency sound) of a vibrating string depends on four things.

- Thicker, more massive strings vibrate more slowly so the strings are thicker as (on a violin) you go down from the E to A to D to G strings, even though the length of the string doesn't change, and its tension does not change much.
- The frequency can also be changed by changing the tension in the string using the tuning pegs: tighter gives higher pitch. This is what the player does when he tunes up.
- The frequency also depends on the length of the string that is free to vibrate. The player changes this by holding the string firmly against the fingerboard with the fingers of the left hand. Shortening the string (stopping it further up the fingerboard) gives higher pitch.
- Finally there is the mode of vibration. When you play harmonics, you induce the string to produce waves which are a fraction of the length of those normally produced by a string of that length.

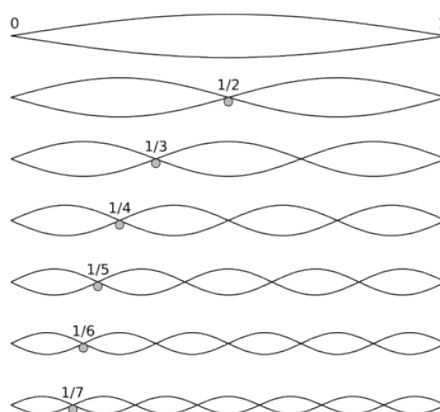


Figure. An illustration of harmonic waves on a string.

**Answer.** The player changes the length of the string that is free to vibrate by holding the string firmly against the fingerboard with the fingers of the left hand. Shortening the string (stopping it further up the fingerboard) gives higher frequency sound.